

Tara Pacific Japan Leg: Tropicalization of Marine Ecosystems under Climate Change and Ocean Acidification

*Sylvain Agostini¹, Yohei Nakamura², Maggy Nugues⁵, Natacha Roux⁵, Hironobu Fukami³, Yuko Kitano⁴, Shoji Yamamoto⁶, Sarah Romac⁸, Nicolas Floc'h⁷, David Lecchini⁵

1. University of Tsukuba Shimoda Marine Research Center, 2. Kochi University, 3. Miyazaki University, 4. University of the Ryukyus, 5. CRIOBE, 6. The University of Tokyo, 7. Ecole Supérieure d'Art de Bretagne, 8. Biological Station of Roscoff

Tara Pacific Expedition: Initiated by Agnès B and Etienne Bourgois, Tara Expeditions gives scientists the opportunity to develop expeditions around the world to study the marine environment. Crisscrossing the Pacific aboard the schooner Tara, scientists coordinated by Serge Planes (CRIOBE, France) and Denis Allemand (CSM, Monaco) are trying to understand the evolution of coral reefs in the context of demographic and climate change. In addition to this global survey, the Tara Pacific project includes targeted studies in diverse countries including Japan.

Japan Leg: Tropicalization of Marine Ecosystems Tropical corals are so threatened by climate change that high latitude may be their last refuge. In Japan, tropicalization of temperate ecosystems is ongoing with a sharp decrease of macroalgae and recolonization by hermatypic corals. This rapid shift is possible because of the recent increased temperature and the high connectivity of with the southern tropical coral reefs through the northward current Kuroshio. However, two factors remain unclear: the effect of herbivorous fishes and of ocean acidification. During the Tara Pacific Japan leg, six locations along the Kuroshio were selected, ranging from reefs in the Ryukyus Archipelago to marginal coral communities in Kochi, Shikine Islands and Tokyo Bay. Two of these: Shikine Island and Iwotorishima also provided the opportunity to study the effect of ocean acidification. At each location, coral diversity, coral algae interactions and, herbivorous fishes communities and grazing rates were quantified in two different sites: dominated by corals (healthy reefs or tropicalized areas) and low coral sites (non-tropicalized or degraded reefs).

Keywords: Tropicalization, Ocean Acidification, Pacific Ocean